Noiseless Switching Power Supply

(English)

ZM460B-APS
ZM360B-APS

User's Manual

Please read this manual first before using product

ZALMAN
Zalman Tech Co., Ltd.

1. Safety Precautions

▣ The following safety precautions and directions are measures against possible accidents and injuries. Please read thoroughly before using the product.

⚠ Warnings

Serious injury or death can occur.

▶ Opening the cover of the product while the power cord is plugged into the outlet can result in electrocution or critical damage to the product.

▶ Handling the power cord with wet hands can result in electrocution.

▶ Inserting fingers or metallic objects into the cooling fan can result in injury or electrocution.

⚠ Cautions

Minor injury can occur. May degrade product conditions or cause malfunction.

▶ Operating in an extremely cold or hot environment can degrade product performance and lifespan.

▶ Allowing liquid to get into the product can result in malfunction.

▶ Operating in a humid or non-ventilated environment can reduce product lifespan.

2. Components

1) One Power Supply
2) One FAN Dual-Connector (ZM-DC1)
   ☞ (For supplying power to an extra fan. See page 5 for details)
3) One Power Cord for AC Power Source (Not included in some countries)
4) One User's Manual
5) Zalman Cable Tie

3. Notes on Installation

※ To ensure safe and easy installation, please read the Safety Precautions above, and the following notes.

▣ Plugging the main power connector P1 into the motherboard while the product is connected to the AC power source may result in damage to the motherboard.

▣ Do not insert the DC output connectors into devices with excessive force as the shape of the connector was designed to prevent incorrect insertion.

▣ If the Power On light fails to light up when the main power button is pressed after completing the installation procedure, then some devices may be plugged in incorrectly or the motherboard may be faulty.

* For more information on the product, please visit our website at www.zalman.co.kr.

4. The Zalman Advantage

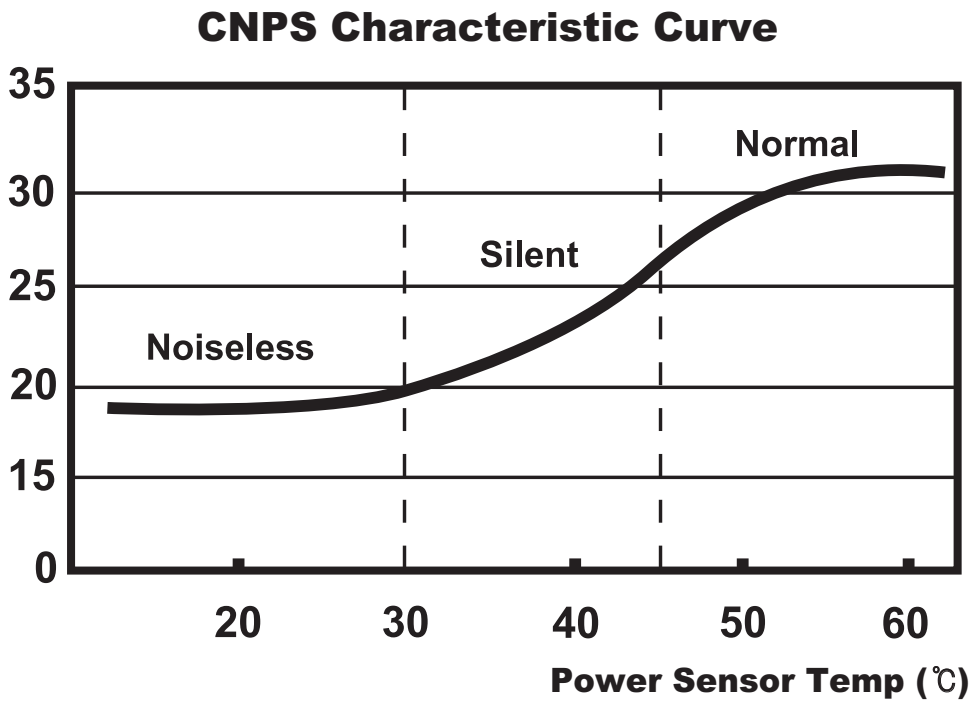
All Zalman Tech products are ultra-quiet in order to achieve enhanced computing environment. This product is an ultra-quiet ATX Ver2.03 / ATX12V Ver2.2 power supply supporting the latest Dual-Core 64 bit Intel Pentium D & AMD Athlon64 X2 CPU-equipped systems.

▣ **CNPS (Computer Noise Prevention System) with Auto Control Cooling Fan**

Noise has been greatly reduced with the implementation of the heat-sensor circuitry, which is in control of the cooling fan's speed (rpm) in relation to the temperature, inside the power supply. The graph below shows the CNPS characteristics of our product.

※ CNPS (Computer Noise Prevention System) refers to a system that reduces a conventional computer's noise (30dB or more) to an inaudible level (20dB or less). In order to create a true noise-free computer, Zalman's other noise-free products should be used together with this product.

◈ **Fig.1: Noise Level (dB) Changes In Relations to Power Supply's Internal Temperature**



Noise Level of ZM360B-APS and ZM460B-APS (dB)

※ The graph above shows that the **ZM360B-APS and ZM460B-APS in "Noiseless" or "Silent" mode** can operate when the power supply's internal temperature is kept below 45℃.
This information is in compliance with the 2nd Revision of ISO7779, an international standard for noise level measurement. Results may vary for different system configuration and/or the test environment.

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▣ Improved Power Factor & Reduced Harmonics through Active PFC

By implementing Active PFC, the power factor (PF) was improved from 75% (Passive PFC) up to 96% (230VAC, Full Load), while harmful harmonic frequencies were reduced below regulatory requirements.

▣ High Efficiency Design

The efficiency of this product exceeds 80% (230VAC, Full Load) with the use of high switching frequency and low power-loss circuitry.

▣ ATX "20+4" - Pin Main Connector

ATX "20+4" - Pin main connector broadens Motherboard compatibility.

▣ ATX12V CPU (4-Pin) & EPS12V CPU (8-Pin) Connectors

Uses two ATX12V 2•™2(4-pin) connectors together to form an EPS12V CPU connector(8-pin).

▣ Dual PCI Express VGA Power Connectors (6-Pin)

Two PCI-Express VGA power connectors are provided to support high-end graphic cards (Nvidia SLI & ATI Cross-Fire).

▣ NMB-MAT 120mm Fan

Fan's noise level can be kept constant compared to other products even if used for a long duration by employing the 2-Ball Bearing 120mm fan of NMB-Matsushita known for their great endurance and excellent reliability.

▣ Dual +12VDC Output

Two +12VDC rails of combined output up to 34A(Only ZM460B-APS) provide more stable power to high-end systems.

▣ EZ Grip Connectors for ODD & HDD

EZ Grip Connectors for ODD & HDD for easy connection and disconnection of the plugs.

▣ Use of gold-plated terminals

Minimized power loss with reduced contact resistance by gold-plating the terminals of all connectors.

▣ WEEE & RoHS

Conforms to WEEE & RoHS Environmental Directives in Europe.

* WEEE : Waste Electrical and Electronic Regulations
* RoHS : Restriction of Hazardous Substances Regulations

▣ Sleeved Cables

All power cables are sleeved for easy cable management and improved air circulation inside the computer case.

▣ Certified with International Safety Approvals & EMC Standards

FCC IDENTIFIER : SAOZM360B-APS SAOZM460B-APS

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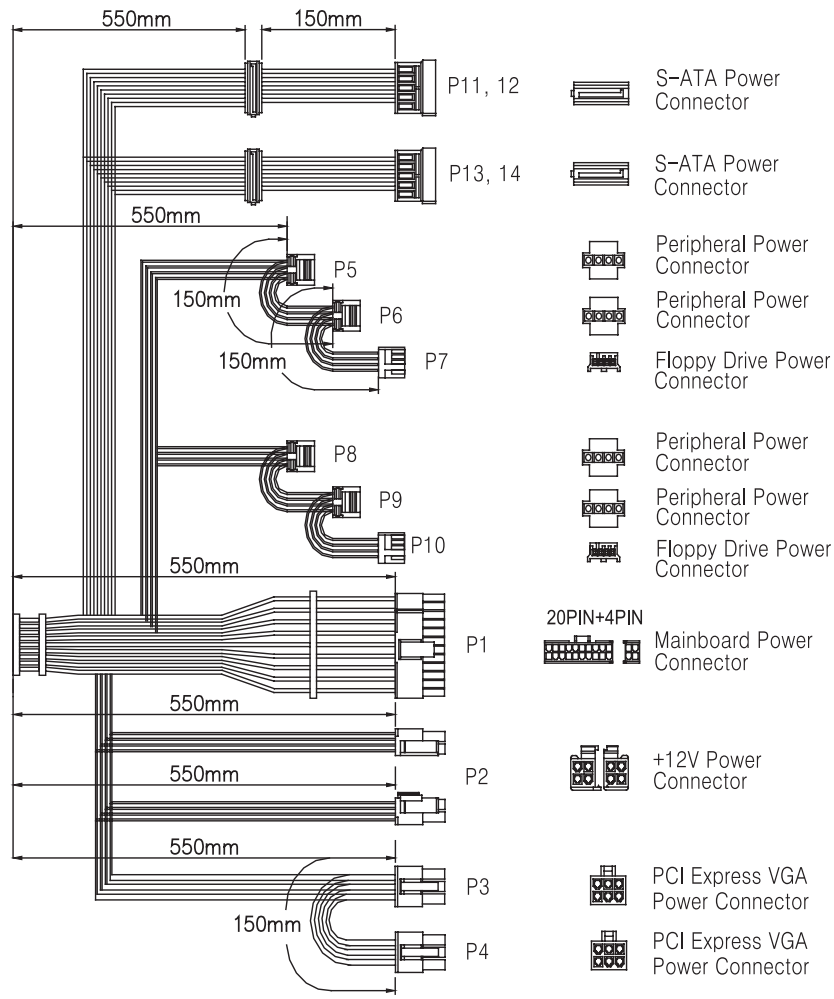
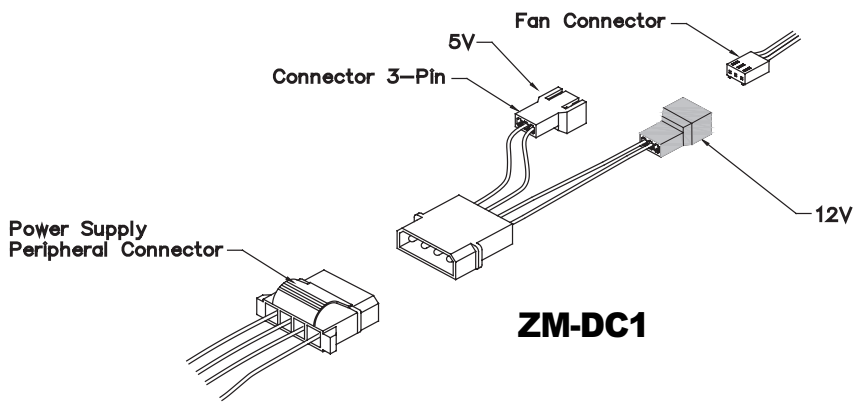
5. Specifications

▣ Output Power Cable Specifications

Cable Lengths & Connector Names	
Using the Dual-Connector (ZM-DC1)	

* For more information on the product, please visit our website at www.zalman.co.kr.

▣ Electrical & Physical Characteristics

		ZM360B-APS	ZM460B-APS
AC Input Range	Voltage	100VAC ~ 240VAC ±10%	
	Frequency	47Hz ~ 63Hz	
AC Input Range (Rated)	115V AC	5A	7.5A
	230V AC	3A	3.5A
PFC Type	Active PFC		
Power Factor	96% minimum @ 230VAC, Full load		
Inrush Current Limit (@ Cold start at 25℃)	115VAC	80A	
	230V AC	120A	
Efficiency	80% minimum @ 230VAC, Full Load		

DC Output Voltage Regulations	Vout	Regulation Range				At Full Load
	+3.3V	±5%	+3.14V	~	+3.47V	
	+5V	±5%	+4.75V	~	+5.25V	
	+12V1	±5%	+11.4V	~	+12.6V	
	+12V2	±5%	+11.4V	~	+12.6V	
	−12V	±10%	-10.8V	~	-13.0V	
	+5VSB	±5%	+4.75V	~	+5.25V	

DC Output Ripple & Noise	Vout	Specification	At Full Load
	+3.3V	50mV	
	+5V	50mV	
	+12V1	120mV	
	+12V2	120mV	
	−12V	120mV	
	+5VSB	50mV	

Protection
Over−Voltage & Current Protection(OVP & OCP)
Under−Voltage Protection (UVP)
Short−Circuit Protection(SCP)
Over−Temperature Protection(OTP)

DC OUTPUT					
ZM360B-APS					
Vout	Output Load Rating			Combined Power	
	Imin	Imax	Ipeak		
+3.3V	0.3A	22A		150W	360W
+5V	0.5A	21A			
+12V1	1A	11A	20A	312W	
+12V2	1A	15A	20A		
−12V	0.0A	0.5A			
+5VSB	0.0A	2.5A	3.5A		

ZM460B-APS					
Vout	Output Load Rating			Combined Power	
	Imin	Imax	Ipeak		
+3.3V	0.3A	30A		152W	460W
+5V	0.5A	30A			
+12V1	1A	16A	20A	408W	
+12V2	1A	18A	22A		
−12V	0.0A	0.8A			
+5VSB	0.0A	2.5A	3.5A		

Ambient Temperature	
Operation	0℃ ~+50℃
Storage	−20℃ ~+80℃

Ambient Humidily	
Operation	5% RH ~ 95% RH
Storage	5% RH ~ 95% RH

Dimensions
ZM360B-APS / ZM460B-APS
150mm(L) * 140mm(W) * 86mm(H)

6. Zalman CNPS(Computer Noise Preventions System) Products

Stable performance and noiseless system can both be achieved with the use of this product with Zalman's Quiet CPU Cooler, Quiet VGA Cooler, Heatpipe HDD Cooler, Fanless Northbridge Cooler, and Noiseless Case Fan.

Quiet CPU Cooler

Quiet VGA Cooler

Heatpipe HDD Cooler

Ultra Quiet CPU Cooler

Fanless Northbridge Cooler

Noiseless Case Fan

* For more information on the product, please visit our website at www.zalman.co.kr.

7. Product Warranty (International)

Thank you for purchasing Zalman's product.

Warranty - If this product has any defects, Zalman guarantees that it can be exchanged within three (3) years from the time of purchase.

❖ Product exchange is done with the reseller that the product was purchased from.
For further inquiries, contact Zalman headquarters at www.zalman.co.kr or via e-mail to a representative.

There will be no exchanges in the following cases :

A) Violation of the Safety Precautions and the Notes on Installation of this manual.
B) Human fatality and/or property damage due to events of natural causes.
C) External case damage, electrical problems, and damage to components caused by careless mishandling.

For Inquiries

< Zalman Tech Co., Ltd. >
Homepage : www.zalman.co.kr
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< Zalman USA Inc. >
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E-mail : support@zalmanusa.com

Disposal of Old Electrical & Electronic Equipment
(Applicable in the European Union and other European countries with separate collection systems)

* For more information on the product, please visit our website at www.zalman.co.kr.